

REMARKS

Applicant has amended the specification to correct a spelling error and canceled claim 7. Applicant believes the remaining claims as filed clearly distinguish from the prior art for reasons discussed below.

In paragraphs 1-3 of the Office Action, the Examiner rejected under 35 U.S.C. 103 claims 1-11 as being made obvious by Wu, U.S. patent 6,190,977 in view of Hori *et al.*, U.S. patent 5,320,974. The Examiner asserts that it would be obvious to combine the teachings of these two patents. Applicant respectfully traverses the Examiner's rejection.

Wu teaches that the short channel effect is suppressed by using the elevated junction above the substrate (column 2, lines 40-45; column 3, lines 57-58; column 6, lines 43-50), and depends on an annealing step to diffuse ions into the channel (col 5, line 65-col 6, line 5). Applicant respectfully asserts that these repeated teachings of the elevated junctions being the answer for short channel effects, and the formation of shallow source/drain junctions by ion diffusion by thermal annealing, teach away from the present invention where halos are formed by direct ion implantation.

Further, Wu teaches that the sidewall spacers are protected from the etch (column 5, lines 62-64), not removed in accordance with the teaching of Hori *et al.* Hori *et al.* teach source/drain regions in the substrate, the removal of the gate sidewall spacer and an angled ion implant into the channel region under the gate to affect the short channel effect, not a vertical ion implant as taught by Wu. Wu's teachings, *coming more than five years after Hori et al.*, specifically teach away from removal of the spacer; therefore Applicant respectfully asserts that it is not obvious to combine Wu with Hori *et al.* to arrive at the present invention in the absence of any suggestion or teaching in Wu to do so (MPEP 2143.01).

Applicant's independent claim 1 claims in part, "forming a spacer on the gate; performing epitaxy to form raised source/drain regions; forming a silicide on the gate and source/drain regions; *removing the spacer*; performing a halo implant; and completing the MOSFET" (emphasis added). Similar language is in claims 5 and 10 and is described in application paragraphs 0013 and 0014. Applicant respectfully asserts that filed claims 1, 5 and 10 specifying the removal of the spacer before the halo implantation, are not made obvious by Wu in view of Hori *et al.* because Wu teaches away from Hori *et al.* Further, referring to Applicant's Figure 4, it is inherently obvious that the angled implant taught by Horri *et al.*

would not have the same effect as a vertical implant as Applicant claims because of shadowing by the raised source/drain and gate structures. Thus, Applicants believe it would not be obvious to apply any of the teachings of Hori *et al.* to Wu as the Examiner postulates. Applicant respectfully requests therefore that this rejection be withdrawn and claims 1, 5 and 10 be passed to allowance. Accordingly, claims 2-4 and 6, 8 and 9 properly depend from claims 1 and 5 and are allowable for reason of their dependency. Applicant therefore respectfully requests that these rejections be withdrawn and claims 1-6 and 8-11 be passed to allowance.

In paragraph 4 of the Office Action, the Examiner addressed the ordinary skill of a routineer. Applicant has canceled claim 7 as being of no patentable weight. Applicant respectfully asserts that claims 2, 4, 5, and 9 properly depend from and narrow claims 1 and 5 and are therefore allowable by reason of their dependency.

CONCLUSION

Applicant believes that the claims are allowable as originally filed. Accordingly, the Applicant respectfully asserts that no claims have been narrowed within the meaning of *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.* (Fed.Cir November 29, 2000). Applicant respectfully submits that the presently claimed invention is patentably distinct over the cited references, and Applicant therefore believes that the pending claims are non-obvious in view of Wu and Hori et al. as required by 35 U.S.C. 103. Therefore Applicant believes the present invention as claimed is patentable. In view of the foregoing amendment and remarks, favorable consideration by the Examiner, withdrawal of the present rejections, allowance of the pending claims, and passage of the present application to issuance are accordingly solicited. The Examiner is cordially invited to telephone the undersigned for any reason which would advance the pending claims toward allowance.

Respectfully submitted,



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MARKED-UP VERSION OF THE SPECIFICATION

[0002] When MOSFET gate length is scaled below 100 nanometers (nm), short channel effects become significant factors. Strong or higher implant dose super halo implants are widely used in deep submicron CMOS technology to engineer the FET channel to overcome short channel effects. Super halo implants, however, tend to degrade the source/drain junction capacitance, resulting in slower switching speed of the transistor. What is needed is a method to engineer the channel doping profile without affecting the source/drain junction region to overcome the short channel effects in deep submicron CMOS chips having gate lengths of 50 nm or [les] less.